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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,296	03/12/2002	Markos Triantafyllou	SC0704EM	2949

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MOTOROLA, INC.
CORPORATE LAW DEPARTMENT - #56-238
3102 NORTH 56TH STREET
PHOENIX, AZ 85018

EXAMINER

THAI, LUAN C

ART UNIT PAPER NUMBER

2827

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/031,296

Applicant(s)

TRIANTAFYLLOU ET AL.

Examiner

Luan Thai

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Information Disclosure Statement

2. The information disclosure statement (IDS) filed on 03/12/02 has been considered by the examiner.

Oath/Declaration

3. The declaration filed 03/12/02 is acceptable.

Abstract

4. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Hopp (3,972,062).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1-3, Hopp (see specifically figures 2-4 and 6-7, Col. 2, lines 23+, lines 40+, Col. 3, lines 1-68) discloses an electronic package assembly comprising: two vertical power transistor devices 10, each having a first side 12 with a plurality of conductive pads 14/16, a second side 18 opposite the first side 12, the second side 18 having further conductive pad (e.g. the collector electrode of the devices 10, Col. 2, lines 52+); a printed circuit substrate 36 (figures 6-7, Col. 3, lines 34+), having a plurality of printed circuit patterns 38/40 bonded to the conductive pads 14/16 of the first sides of the vertical power transistor devices 10, and arranged to provide logic interconnections between the devices; a leadframe 20 including leads 24/26 provided external connections for the package assembly (Col. 3, lines 54+), and having a non-lead island portion 22 bonded to the further conductive pads at the second sides 18 of the vertical power transistor devices 10, wherein the island portion of the leadframe forms a power interconnection between the two vertical power transistor devices 10 (see figures 4 and 7). Hopp also discloses the leadframe 20 further comprising a substrate lead portion 32/34 (see figure 7), which is connected to the island portion 22 of the leadframe and arranged to connect to a further pad 42/44 of the printed circuit substrate 36, thereby directly connecting the leadframe to the

substrate. As a result, the conductive pads of the second sides 18 of the semiconductor devices 10 are directly electrically connected to the substrate.

Regarding claim 5, Hopp further discloses the leadframe having the contact bump 23 to which the electronic device is coupled (Col. 3, lines 8-20).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hopp (3,972,062).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 4, since Hopp discloses that a plurality of semiconductor devices can be mounted directly onto the island portion 22 of the leadframe 20 (see figures 2-4, Col. 2, lines 23+), one of the devices would be obviously considered as a discrete electronic device.

Regarding claims 6-7, Hopp discloses all the limitations of the claimed invention as detailed above except for specifying the vertical power transistors forming a vertical H-bridge power transistor arrangement (as claimed in claim 6) or forming a full-bridge high-sided switch arrangement (as claimed in claim 7). Applicant's claimed structures in claims 6-7 do not distinguish over the Hopp

reference and it has been held that a recitation (e.g., to form a vertical H-bridge power transistor arrangement (recited in claim 6) or a full-bridge high-sided switch arrangement (recited in claim 7)) with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

9. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hopp (3,972,062) in view of Lorenz et al (6,324,072).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 8-9, the electronic package assembly of Hopp discloses all the limitations of the claimed invention as detailed above except for electronic devices attached to the second surface of the substrate, and electrical vias electrically connecting the first and the second surfaces of the substrate.

Lorenz et al while related to a similar electronic package assembly teach (see figures 1-3) at least two transistors 12 electrically connected to pads 6 on the first surface of the substrate 5 and electronic devices 11 electrically attached to the second surface of the substrate 5, wherein electrical vias 10 are arranged to electrically interconnect the first and the second surfaces of the substrate 5 (Col. 9, lines 40+, lines 58+), in order to connect the components that belong together in the immediate vicinity of one another without bond wires (Col. 10, lines 1+) and to make a very simple and expedient design attainable (Col. 6, lines

48+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Lorenz teachings of the substrate to Hopp's package assembly in order to have a compact package in which the components that belong together can be electrically connected without bonding wires, and to make a very simple and expedient design attainable.

Regarding claim 10, Lorenz et al disclose the conductive vias 10 electrically interconnecting the conductive pads on the first and the second surface of the substrate 5 together, wherein the semiconductor devices 12 are electrically connected to the conductive pads on the first surface of the substrate via electrically conductive balls 8 (Col. 9, lines 47+). Thus, the heat generated from the semiconductor devices 12 would be obviously dissipated through the conductive balls 8 and the conductive vias 10 of the proposed semiconductor package of Hopp and Lorenz.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'Luan Thai', followed by a long horizontal flourish line extending to the right.

Luan Thai
April 19, 2003